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RemarksA. Period For Reply

A shortened statutory period was set to expire three months from the Office Action of December 14, 2004. Three months from December 14, 2004 is March 14, 2005. This Amendment and Remarks is being filed on or before Monday, March 14, 2005.

B. Status

The Office Action was non-final.

C. Disposition Of Claims

Claims 4-7 are pending.

D. Application Papers

As to drawings, there are no drawings in this case.

E. Priority under 35 U.S.C. §§ 119 and 120

Acknowledgment of the claim for foreign priority and of the receipt of the priority document were made in the Office Action dated July 1, 2004. This is appreciated.

As to domestic priority, this case does not claim domestic priority.

F. Attachments

Applicants filed one PTO-1449 form in this application, with the filing of this case on October 13, 2003. The PTO-1449 form has been initialed and signed by the Patent Office and returned with the Office Action of July 1, 2004. This is very much appreciated.

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G. Basis for amendments (if any) to the claims and basis for new claims (if any)

Claim 7 has been amended to comply with 35 U.S.C. 112, second paragraph, as instructed by the Patent Office.

No new claims have been added.

H. The Office Action

On page 2 of the Office Action, the outstanding rejection under section 103 was withdrawn. This is appreciated.

On page 2 of the Office Action, claim 7 was rejected under 35 U.S.C. 112, second paragraph, as being indefinite. The term "gently" was objected to. In response, claim 7 has been amended to delete "gently." It is therefore respectfully submitted that the claims are now in compliance with 35 U.S.C. 112, second paragraph.

On page 3 of the Office Action, claims 4-6 were rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,892,856 to Kawajiri et al. This rejection is respectfully traversed on the basis of applicant's discussion below.

I. Applicant's discussion

I.1. Independent claim 4

Independent claim 4 is set out below with the limitation to be discussed underlined:

4. (previously presented) A process for production of acrylic acid, which comprises the step of carrying out catalytic gas phase oxidation of acrolein in the presence of molecular oxygen, thereby producing the acrylic acid; with the step of carrying out catalytic gas phase oxidation using a catalyst which is obtained by a process that includes the steps of: heating a mixed liquid of starting materials including molybdenum and vanadium as essential components; and then molding the resultant dried material with a liquid binder; and then calcining the resultant molding; wherein the liquid binder is an aqueous liquid of 7.0 to 10.0 in pH.

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In contrast to the underlined requirement, Kawajiri et al. teaches distilled water. Please see Example 1 of Kawajiri et al. where a suspension A was prepared from an aqueous solution containing a molybdenum compound and a vanadium compound, where the suspension A was then evaporated and dried to obtain a powder, and where the powder was then charged together with distilled water as a binder with blowing heated air at 90 °C to form spherical particles.

Distilled water has a pH of less than 7.0. Distilled water is weakly acidic.

Please see page 8, lines 5-15 of applicant's specification. Here applicant teaches that when materials come in a state not satisfying the specific range of pH (7.0 to 10.0, or 7.5 to 9.5, or 8.0 to 9.0), the pH values of such materials are adjusted to the above specific range in advance of use for the present invention. Here applicant further teaches that:

In addition, generally, water (e.g. ion-exchanged water) is also used as the liquid binder. However, in the usual handling, even the ion-exchanged water exists in a state having absorbed carbon dioxide gas from air. Therefore, its pH is not 7.0, but in the weak acid range less than it.
[emphasis added]

Applicant, not the Kawajiri et al. reference, appreciated and identified what ion-exchanged water is and is not. The Kawajiri et al. reference does not disclose or suggest the claimed requirement that the liquid binder be an aqueous liquid having a pH of 7.0 to 10.0. Hence, allowance of independent claim 4 is respectfully requested.

I.2. Dependent claim 5

Dependent claim 5 is set out below with the limitation to be discussed underlined:

5. (previously presented) A process for production of acrylic acid according to claim 4, wherein the liquid binder

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is an aqueous liquid of 7.5 to 9.5 in pH.

A binder having a pH of 7.5 is greatly more basic than a binder having a pH of 7.0. Allowance of dependent claim 5 is respectfully requested.

I.3. Dependent claim 6

Dependent claim 6 is set out below with the limitation to be discussed underlined:

6. (previously presented) A process for production of acrylic acid according to claim 4, wherein a physical strength of the catalyst is 98.6 mass % or more.

Please see Comparative Example 3 of the present specification. Here ion-exchanged water is used as a binder and the pH of the ion-exchanged water is 6.0. The results are shown in Table 1 of page 18. The physical strength of the catalyst of Comparative Example 3 is 97.1 mass %, which is outside of the claimed range of dependent claim 6. Allowance of dependent claim 6 is therefore respectfully requested.

I.4. Dependent claim 7

The Patent Office has indicated that dependent claim 7 is allowable. This is very much appreciated. However, dependent claim 7 sets out a "test" by which the physical strength of a catalyst can be measured. Dependent claim 7 is reproduced below for easy reference by the Patent Office.

7. (currently amended) A process for production of acrylic acid according to claim 6, wherein the physical strength of the catalyst is measured in accordance with the following procedure:

- a) providing a stainless-steel-made reaction tube of 25 mm in inner diameter and 5,000 mm in length and setting said stainless-steel-made reaction tube in a vertical direction;
- b) closing a lower end of said stainless-steel-made reaction tube with a stainless-steel-made receiving plate of 1 mm in thickness;
- c) dropping 50 g of the catalyst from an upper end of the stainless-steel-made reaction tube into the stainless-steel-made reaction tube;

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d) removing the stainless-steel-made receiving plate, having the catalyst that has been dropped, from the stainless-steel-made reaction tube such that the catalyst is gently extracted from the stainless-steel-made reaction tube;

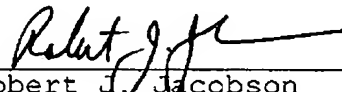
e) sieving the catalyst that has been extracted with a sieve having a mesh opening size of 4 mm; and

f) wherein the physical strength (mass %) of the catalyst equals $[(\text{mass of catalyst remaining on sieve}) / (\text{mass of catalyst as dropped from the upper end of the stainless-steel-made reaction tube})] \times 100$.

J. Summary

Recognition or identification of a problem is a cornerstone to invention. Here applicant identified that even ion-exchanged water exists in a state having absorbed carbon dioxide gas from air, that ion-exchanged water is therefore weakly acidic, and that therefore ion-exchanged water was unsatisfactory for use in applicant's process for production of acrylic acid. Moreover, the prior art neither discloses nor suggests the requirements of applicant's claims.

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Robert J. Jacobson
Reg. No. 32,419

Tel. No.: (651) 699-7900
Fax. No.: (651) 699-7901

650 Brimhall Street South
St. Paul, MN 55116-1511